

Tropical Cyclone Report
Hurricane Nora
1-9 October 2003

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a. Synoptic History

Nora developed from a tropical wave that moved off the coast of Africa on 13 September. There were various attempts for this wave to develop as it moved westward across the Atlantic and the Caribbean Sea. The wave crossed Central America accompanied by cloudiness and numerous thunderstorms on 25 September. The main shower activity continued westward very near the southern coast of Mexico. However, it was not until 1800 UTC 1 October that the activity became organized enough for the system to be classified as a tropical depression. It was then located about 525 nautical miles south of the southern tip of Baja California. The cloud pattern continued to organize and the system became a tropical storm at 0600 UTC 2 October. Nora moved slowly westward and then west-northwestward and reached hurricane status at 0000 UTC 4 October, reaching its peak intensity of 90 knots and a minimum pressure of 969 mb 12 h later. Nora maintained hurricane status for two days as it continued moving slowly toward the northwest. The cyclone then made a sharp turn to the east and northeast ahead of a strong middle-level trough. This trough, and the outflow from Hurricane Olaf, which was located to the southeast of Nora, produced strong southwesterly shear over the cyclone, resulting in weakening. The poorly-defined center of Tropical Depression Nora reached the coast of Mexico just north of Mazatlan early on the 9th and rapidly dissipated over the high terrain.

The “best track” chart of the tropical cyclone’s path is given in Fig. 1, with the wind and pressure histories shown in Figs. 2 and 3, respectively. The best track positions and intensities are listed in Table 1.

b. Meteorological Statistics

Observations in Nora (Figs. 2 and 3) include satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB) and the U. S. Air Force Weather Agency (AFWA). Operationally, scatterometer wind data were used to downgrade Nora to tropical depression status at 0600 UTC 7 October.

c. Casualty and Damage Statistics

According to reports from the Mexican Weather Service, the impact of Nora on the coast of

Mexico was minimal, and there were no reports of damages or casualties. Heavy rains affected the state of Sinaloa.

d. Forecast and Warning Critique

Average official track errors for Nora were 32, 62, 88, 108, 139, 195 and 293, n mi for the 12, 24, 36, 48, 72, 96 and 120 h forecasts, respectively¹. For comparison, the average errors for the 10-yr period of 1993-2002² are 39, 72, 103, 131, 186, 197 and 223 n mi, respectively. The performance of the available track models is given in Table 2. Note that the UK model was better than the official forecast for the 24 through the 120 h periods and the consensus GUNA was better than the official at all times. However, the model consensus GUNA and GUNS were not available at the 120-h period.

Average official intensity errors were 6, 11, 15, 20, 22, 16 and 11 kt for the 12, 24, 36, 48, 72, 96, and 120 h forecasts, respectively. For comparison, the average official intensity errors over the 10-yr period 1993-2002² are 6, 11, 15, 17, 20, 18 and 19 kt, respectively. Nora was forecast to intensify further when it reached 90 knots, based on low shear indicated by SHIPS model guidance. Instead, the hurricane began to weaken due to the shear caused by Olaf.

Since Nora was expected to reach land as a tropical depression, there were no watches and warnings issued.

¹ All forecast verifications in this report include the depression stage of the cyclone. National Hurricane Center verifications presented in these reports prior to 2003 did not include the depression stage.

² Errors given for the 96 and 120 h periods are averages over the two-year period 2001-2002.

Table 1. Best track for Hurricane Nora, 1-9 October 2003.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
01 / 1800	15.7	108.1	1007	25	tropical depression
02 / 0000	15.7	108.4	1005	30	"
02 / 0600	15.6	108.7	1005	35	tropical storm
02 / 1200	15.4	108.9	1005	35	"
02 / 1800	15.3	109.0	1002	40	"
03 / 0000	15.1	109.1	997	50	"
03 / 0600	15.1	109.2	997	55	"
03 / 1200	15.4	109.3	994	55	"
03 / 1800	16.0	109.7	992	60	"
04 / 0000	16.2	110.3	987	65	hurricane
04 / 0600	16.5	110.9	981	75	"
04 / 1200	16.9	111.5	969	90	"
04 / 1800	17.4	112.0	970	90	"
05 / 0000	18.0	112.6	970	90	"
05 / 0600	18.5	113.0	970	90	"
05 / 1200	19.0	113.4	973	85	"
05 / 1800	19.3	113.6	976	80	"
06 / 0000	19.7	113.8	976	80	"
06 / 0600	20.1	113.9	987	65	"
06 / 1200	20.1	113.9	997	50	tropical storm
06 / 1800	20.1	113.9	1000	40	"
07 / 0000	20.3	113.6	1001	35	"
07 / 0600	20.3	113.3	1002	30	tropical depression
07 / 1200	20.1	112.6	1002	30	"
07 / 1800	20.1	111.6	1002	30	"

08 / 0000	20.3	110.4	1002	30	"
08 / 0600	21.0	108.0	1004	25	"
08 / 1200	21.0	108.0	1004	25	"
08 / 1800	22.3	107.2	1004	25	"
09 / 0000	23.1	106.9	1003	25	"
09 / 0600	23.8	106.7	1004	25	landfall near Mazatlan
09 / 1200					dissipated
04 / 1200	16.9	111.5	969	90	minimum pressure

Table 2. Preliminary forecast evaluation (heterogeneous sample) for Nora, 1-9 October 2003. Forecast errors (n mi) are followed by the number of forecasts in parentheses. Errors smaller than the NHC official forecast are shown in bold-face type. Verification includes the depression stage.

Forecast Technique	Forecast Period (h)						
	12	24	36	48	72	96	120
CLP5	45 (29)	94 (27)	147 (25)	197 (23)	285 (19)	334 (15)	413 (11)
GFNI	31 (20)	55 (20)	72 (20)	90 (20)	128 (16)		
GFDI	35 (29)	64 (27)	93 (25)	121 (23)	172 (18)	213 (11)	218 (6)
GFDL	36 (28)	55 (26)	84 (24)	115 (22)	169 (17)	247 (10)	240 (5)
GFDN	37 (12)	59 (10)	78 (10)	95 (10)	102 (9)		
LBAR	46 (29)	100 (27)	169 (25)	252 (23)	412 (19)	527 (15)	614 (11)
AVNI	54 (26)	90 (24)	115 (22)	136 (21)	238 (14)	391 (12)	572 (9)
AVNO	63 (27)	107 (24)	132 (22)	155 (21)	242 (14)	377 (12)	539 (9)
AEMI	50 (18)	103 (18)	163 (18)	227 (17)	310 (14)	342 (9)	578 (4)
BAMD	76 (29)	159 (27)	250 (25)	345 (23)	518 (19)	647 (15)	775 (11)
BAMM	69 (29)	145 (27)	231 (25)	320 (23)	479 (19)	583 (15)	606 (11)
BAMS	67 (29)	130 (27)	203 (25)	282 (23)	413 (19)	543 (15)	732 (11)
NGPI	36 (29)	59 (27)	90 (25)	142 (23)	233 (18)	271 (15)	366 (11)
NGPS	42 (28)	55 (26)	72 (24)	119 (22)	208 (16)	269 (13)	363 (10)
UKMI	31 (26)	56 (25)	76 (23)	99 (21)	127 (15)	141 (9)	96 (2)
UKM	45 (14)	59 (13)	77 (12)	84 (11)	121 (8)	139 (5)	92 (1)
GUNS	30 (26)	51 (25)	77 (23)	111 (21)	152 (13)	102 (5)	
GUNA	31 (25)	55 (24)	76 (22)	99 (21)	104 (11)	144 (5)	
OFCL	32 (29)	62 (27)	88 (25)	108 (23)	139 (19)	195 (15)	293 (11)
NHC Official (1993-2002 mean)	39 (2864)	72 (2595)	103 (2314)	131 (2050)	186 (1603)	197 (210)	223 (143)

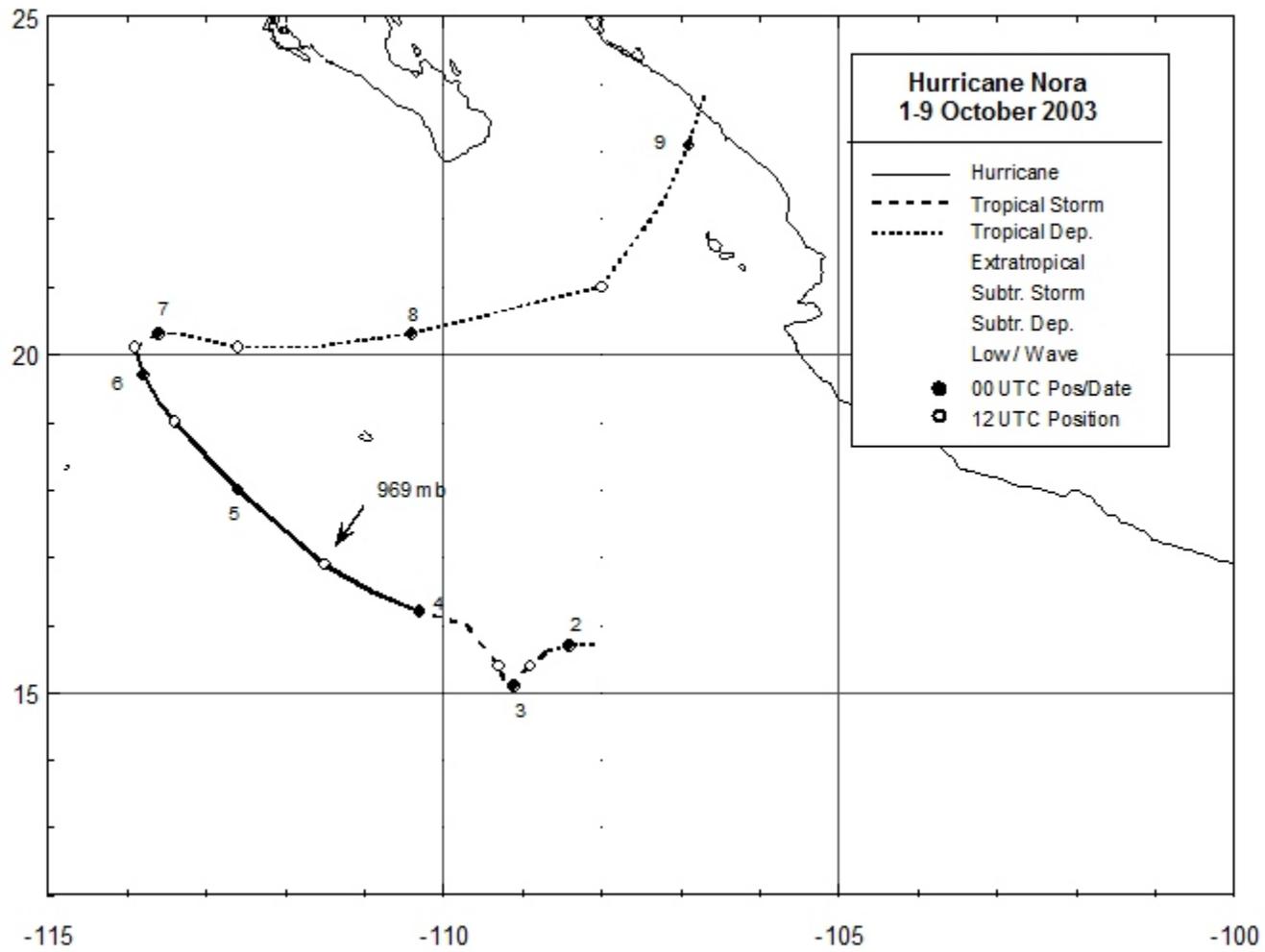


Figure 1. Best track positions for Hurricane Nora, 1- 9 October 2003.

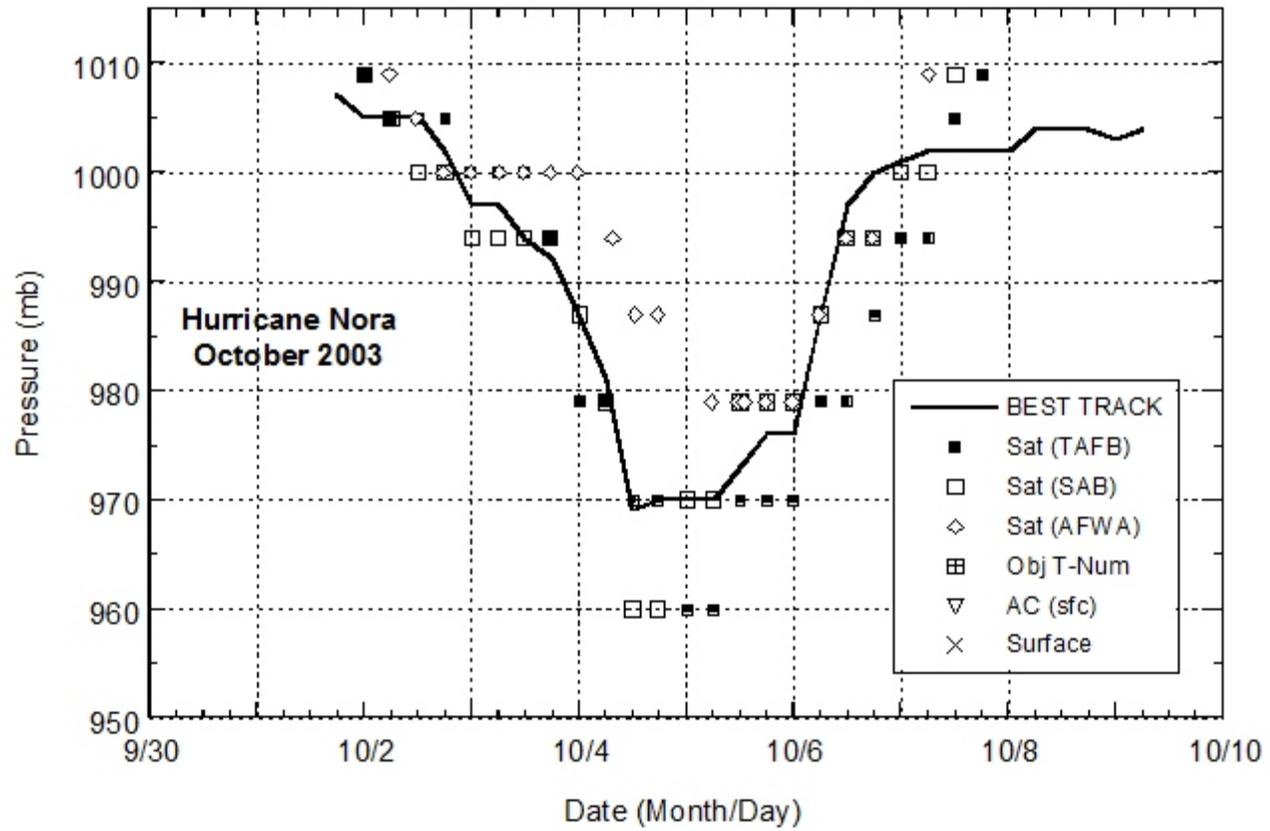


Figure 3. Best track minimum central pressure curve for Hurricane Nora, 1-9 October 2003.